

WHAT IS CLAIMED IS:

1. An electron-emitting device, comprising:
a cathode electrode and a gate electrode, which
are formed on a surface of a substrate and opposed to
5 each other with a space therebetween; and
a film containing an electron-emitting material,
which is located on the cathode electrode,
wherein the film containing the electron-
emitting material has two end portions in a plane
10 substantially parallel to the surface in a direction
substantially perpendicular to a direction along
which the cathode electrode and the gate electrode
are opposed to each other,
wherein a structure is used in which electric
15 field strengths applied between each of the two end
portions of the film containing the electron-emitting
material and the gate electrode are made weaker than
an electric field strength applied between a region
between the two end portions of the film containing
20 the electron-emitting material and the gate electrode
at a time of driving.

2. An electron-emitting device, comprising:
a cathode electrode and a gate electrode, which
25 are formed on a surface of a substrate and opposed to
each other with a space therebetween; and
a film containing an electron-emitting material,

which is located on the cathode electrode,

wherein the film containing the electron-emitting material has two end portions in a plane substantially parallel to the surface of the

5 substrate in a direction substantially perpendicular to a direction along which the cathode electrode and the gate electrode are opposed to each other,

wherein an area of a portion of the cathode electrode between each of the two end portions of the
10 film containing the electron-emitting material and the gate electrode in the plane substantially parallel to the surface of the substrate is larger than an area of a portion of the cathode electrode between a region located between the two end portions
15 of the film containing the electron-emitting material and the gate electrode.

3. An electron-emitting device, comprising:

a cathode electrode and a gate electrode, which
20 are formed on a surface of a substrate and opposed to each other with a space therebetween; and

a film containing an electron-emitting material, which is located on the cathode electrode,

wherein the film containing the electron-
25 emitting material has two end portions in a plane substantially parallel to the surface of the substrate in a direction substantially perpendicular

to a direction along which the cathode electrode and the gate electrode are opposed to each other,

wherein the cathode electrode has protruding portions in areas between each of the two end portions of the film containing the electron-emitting material and the gate electrode in a plane substantially parallel to the surface of the substrate, the protruding portions protruding more to the gate electrode side as compared with an area between a region located between the two end portions of the film containing the electron-emitting material and the gate electrode.

4. An electron-emitting device, comprising:

a cathode electrode and a gate electrode, which are formed on a surface of a substrate and opposed to each other with a space therebetween; and

a film containing an electron-emitting material, which is located on the cathode electrode,

wherein the film containing the electron-emitting material has two end portions in a plane substantially parallel to the surface of the substrate in a direction substantially perpendicular to a direction along which the cathode electrode and the gate electrode are opposed to each other,

wherein the gate electrode has a shape in which a distance therefrom to a region located between the

two end portions of the film containing the electron-emitting material is shorter than a distance therefrom to each of the two end portions of the film containing the electron-emitting material.

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5. An electron-emitting device, comprising:

a cathode electrode and a gate electrode, which are formed on a surface of a substrate and opposed to each other with a space therebetween; and

10 a film containing an electron-emitting material, which is located on the cathode electrode,

wherein the film containing the electron-emitting material has two end portions in a plane substantially parallel to the surface of the substrate in a direction substantially perpendicular to a direction along which the cathode electrode and the gate electrode are opposed to each other,

15 wherein a distance from a center line between the cathode electrode and the gate electrode to a region located between the two end portions of the film containing the electron-emitting material is shorter than a distance from the center line to each of the two end portions of the film containing the electron-emitting material.

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6. An electron-emitting device according to claim 1, wherein the film containing the electron-

emitting material comprises a plurality of fibrous
conductive materials.

7. An electron-emitting device according to
5 claim 1, wherein the film containing the electron-
emitting material contains mainly carbon.

8. An electron-emitting device according to
claim 1, wherein the film containing the electron-
10 emitting material comprises a plurality of carbon
fibers.

9. An electron-emitting device according to
claim 8, wherein each of the plurality of carbon
15 fibers includes at least one of a carbon nanotube, a
graphite nanofiber, an amorphous carbon fiber, and a
diamond fiber.

10. An electron source, comprising:
20 a plurality of electron-emitting devices, each
of which is constructed according to any one of
claims 1.

11. An image display apparatus, comprising:
25 an electron source constructed according to
claim 10; and
a light emitting member.